



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/689,043

10/21/2003

Li Yao

60937-0151-US

4499

9629 7590 04/20/2007  
MORGAN LEWIS & BOCKIUS LLP  
1111 PENNSYLVANIA AVENUE NW  
WASHINGTON, DC 20004

EXAMINER

ALANKO, ANITA KAREN

ART UNIT

PAPER NUMBER

1765

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

04/20/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/689,043

Applicant(s)

YAO ET AL.

Examiner

Anita K. Alanko

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 2-10, 14 and 16-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-10, 14 and 16-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-10, 14, 16-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 14 and 27, the wherein clause that cites the metal removal rate is unclear. The claim does not cite which step this removal step refers to, and it is unclear if the same composition provides for the three removal rates.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

---

Claims 2-10, 14, 16-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al (US 7,008,554 B2) in view of Sun et al (US 6,858,540 B2).

Tsai discloses a method comprising:

providing a substantially abrasive-free (since abrasives are optional, “may further include” is interpreted to mean that it may not include, col. 6, lines 17-18) CMP composition that includes a hydroxylamine derivative (1%, col.6, lines 49-51), a corrosion inhibitor (0.02% BTA, col. 7, lines 50-60), and water (col.8, line 8);

contacting the composition with a substrate 400 having a metal oxide surface 410, barrier layer 412 and metal layer 413 (col.9, line 64-col.10, line 34);

chemically mechanically polishing the substrate by contacting the substrate surface with a polishing pad 300 at an applied pressure of 2 psi (including a range of 1-2 psi, col.6, lines 6-7) and by moving the pad in relation to the substrate,

wherein the removal rate of the barrier layer is greater than about 500 Å/min (700 Å/min col.10, line 49, or in the range of 300-500 Å/min col.8, lines 55-56), and wherein the removal rate of the metal oxide layer is less than about 10 Å/min (because of the high selectivity, col.8, line 54, and since the same method is conducted, the same results are expected).

Tsai fails to disclose the type of polishing pad. Sun teaches that a useful pad for polishing includes a fixed abrasive pad (col.8, lines 14-18). It would have been obvious to one with ordinary skill in the art to use an abrasive polishing pad in the method of Tsai because Sun teaches that they are useful for polishing barrier layers.

As to amended claims 14 and 27, Tsai fails to disclose the metal polishing rate. However, since Tsai has the same composition (HDA concentration, BTA concentration, pH,

same barrier and dielectric removal rates), the composition is expected to provide the same results, and therefore to provide the same metal polishing rate.

As to claims 24-25, Tsai teaches a range of pH including 3-7 (col.7, lines 3-10). Since Tsai teaches a range, Tsai also teaches that the pH may be changed according to the desired polishing results. The pH affects the reaction kinetics. It would have been obvious to one with ordinary skill in the art to vary the pH to the range cited in the modified method of Tsai because the pH appears to reflect a result-effective variable which can be optimized. See MPEP 2144.05 IIB.

### ***Response to Arguments***

Applicant's arguments filed 1/9/07 have been fully considered but they are not persuasive. Applicant argues that Tsai does not teach the specific maximum rate of metal removal. In response, Tsai teaches a composition that is the same as the instant invention, and it is therefore expected to have the same properties, including metal removal rate less than the cited maximum. Tsai is expected to have inherently the same metal polishing rate since the same barrier layer removal rate and metal oxide removal rate is cited in Tsai as in the instant invention and since the composition is the same as cited in the instant invention.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art shows hydroxylamine polishing of semiconductors.

---

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anita K. Alanko whose telephone number is 571-272-1458. The examiner can normally be reached on Mon-Fri until 2:30 pm (Wed until 11:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Anita K. Alanko*  
Anita K Alanko  
Primary Examiner  
Art Unit 1765